AF/2700 #

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor : Pradeep K. Subrahmanyan	Appeal No.
Appln. No.: 09/767,546	
Filed : January 23, 2001	Group Art Unit: 2651
For : DISC STORAGE SYSTEM WITH ADAPTIVE PID CONTROL	Examiner: Andrew L. Sniezak
Docket No.: S01.12-0644	

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION - 37 C.F.R. § 192)

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I HEREBY CERTIFY THAT THIS PAPER IS BEING SENT BY U.S. MAIL, FIRST CLASS, TO THE COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, THIS

10 DAY OF September, 2003.

PATENT ATTORNEY

Sir:

Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal filed on July 16, 2003.

FEE STATUS

[---] Small entity status under 37 C.F.R. §§ 1.9 and 1.27 is established by a verified statement---.

FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. 1.17(c) the fee for filing the Appeal Brief is $320.00/$160.00.

The Director is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 23-1123. A duplicate copy of this communication is enclosed.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

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BRIEF FOR APPELLANT

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PATENT ATTORNEY

Sir:

This is an appeal from an Office Action dated April 16, 2003 in which claims 19 to 34 and 36 were finally rejected.

REAL PARTY IN INTEREST

Seagate Technology LLC, a corporation organized under the laws of the state of Delaware, and having offices at 920 Disc Drive, Scotts Valley, California 95066, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment filed with the patent application and recorded on Reel 011478, frame 0762.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF THE CLAIMS

I. Total number of claims in the application.

	Claims in the application are:	1-36

II. Status of all the claims.

A.	Claims cancelled:	1-18
B.	Claims withdrawn but not cancelled:	none
C.	Claims pending:	19-36
D.	Claims allowed:	35
E.	Claims rejected:	19-34, 36

III. Claims on appeal

	The claims on appeal are:	19-34, 36

STATUS OF AMENDMENTS

An Amendment after Final was filed on July 16, 2003. The Examiner mailed a reply on August 1, 2003.

SUMMARY OF INVENTION

FIG. 1 pictorially illustrates an embodiment of a disc drive 100 in which a portion 132 of a controller 130 receives a sensed actuator position on line 138 and provides a control output on line 146 that controls actuator position. The arrangement is used to adaptively control a read/write head position to a desired actuator position indicated by a setpoint 152 received from a CPU of a computer. The portion 132 of controller 130 includes adaptive parameter data $\hat{A}$ stored in RAM 142, and an adaptive controller process or algorithm stored in ROM 144. In one embodiment, the adaptive parameter data $\hat{A}$ is an estimate of a ratio A of an inertia J to a torque constant K_t of the actuator. The operation of the controller is described in the specification on page 4, lines 7-28. Successively more detailed block diagram examples of a controller such as the one described in FIG. 1 are shown in FIGS. 2 and 3. A flow chart in FIG. 6 shows a discrete algorithm example of operation of a controller such as the one shown in FIG. 1.

FIG. 2 is a block diagram illustration of a disc drive 200, that has a controller portion 132 that includes an adaptive controller 202 that controls a voice coil motor 204 that positions a read/write head 206 on a disc 126. The operation of the controller is described in more detail in Equation 22 (specification, page 12) and by way of an example illustrated in FIG. 3. The controller portion 132 also includes an adaptive system 210 that provides adaptive parameter data $\hat{A}$ along line 212 to the adaptive controller 202. The adaptive system 210 receives data on line 211, 213 and calculates the adaptive parameter data $\hat{A}$, typically based on a position error signal and a setpoint. The operation of the disc drive 200 is described in the specification on page 5, line 2 to page 6, line 12.

FIG. 3 illustrates a block diagram of an adaptive controller 201. The controller 201 includes a nominal controller 222 with transfer function G1, an algebraic part controller 224 with transfer function G2 and a feedforward controller 226 with a transfer function G3. The algebraic part controller 224 and the feedforward controller 226 receive adaptive parameter data $\hat{A}$ on line 212. The outputs of the controllers 222, 224, 226 are summed at a summing junction 234 and the sum is provided as the output 203 of the controller 201. The function of the nominal controller 222 is described in Equations 3-11. The function of the algebraic part controller is defined in an equation at page 11, line 14. The summed function of the nominal controller 222 and the algebraic controller 224 is described in Equation 17 on page 11. The summed function of the nominal controller 222, the algebraic controller 224 and the feedforward controller 226 is described in Equations 22-23 on page 12.

FIGS. 4, 5 and 7 illustrate performance of parts of an adaptive controller in the form of root locus (FIG.4), Bode plot (FIG. 5) and computer simulated time response (FIG.7).

FIG. 6 illustrates a flow chart of digital (discrete) methods

of calculating an updated adaptive parameter $\hat{A}_N$ and of calculating an adaptively updated controller output U_N using the adaptive parameter data $\hat{A}_N$. The adaptive parameter data $\hat{A}_N$ is an estimate of ratio A of inertia J to torque constant K_t in of the actuator.

DESCRIPTION OF REFERENCES RELIED ON BY THE EXAMINER

The Examiner cites the following references:

Baba U.S. Patent 5,875,162

Clare et al. U.S. Patent 5,898,286

Copies of the references are provided in Appendix B.

ISSUES

1.-Whether Claims 19, 20, 28, 31-34 are novel under 35 USC 102(e) in view of Baba U.S. Patent 5,875,162.

2.-Whether Claims 21-24, 26, 27, 29, 30 and 36 are non-obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of Clare et al. U.S. Patent 5,898,286.

3.-Whether Claim 25 is non-obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of Clare et al. U.S. Patent 5,898,286 and further in view of the Examiner's "official notice".

GROUPING OF CLAIMS

The following groupings of claims are made solely in the interest of consolidating issues and expediting this Appeal. No grouping of claims is intended to be nor should be interpreted as being any form of admission or a statement as to the scope or obviousness of any limitation.

Group I: Claims 19-22, 28-34, 36

Group II: Claims 23-27

ARGUMENT

Prior to discussing each of the art rejections appearing

below as Issues 1-3, Appellant would first like to draw the board's attention to the meanings of the terms "feedback control" and "adaptive control" as used in the relevant field of control systems art. The Instrument Society of America's Dictionary of Measurement and Control, (Third Edition, 1995, ISBN 1-55617-528-0), defines terms as follows:

> feedback control. An error-driven control system in which the control signal to the actuators is proportional to the difference between a command signal and a feedback signal from the process variable being controlled. See "control, feedback."
>
> control, feedback. Control in which a measured variable is compared to its desired value to produce an actuating error signal which is acted upon in such a way as to reduce the magnitude of the error.
>
> control, adaptive. Control in which automatic means are used to change the type or influence (or both) of control parameters in such a way as to improve the performance of the control system.

In considering the art cited, the Examiner is finding examples in the art of what is clearly "feedback control" and construing those examples as "adaptive control" without a basis for doing so. As pointed out in the above definition of "adaptive control" (provided to the Examiner in the Appellant's Amendment after Final), adaptive control includes an automatic change to the type or influence of control parameters that is in addition to the feedback control. In art cited by the Examiner, controllers are taught that generate control outputs, however the controllers have control parameters that are not disclosed to be automatically

adapted. In the claims on appeal, each claim includes an "adaptively generating" limitation in combination with a limitation to "at least one of a torque and an inertia," which limitations are not disclosed in the art cited by the Examiner.

1. (Group I Claims) Claims 19, 20, 28, 31-34 are novel under 35 USC 102(e) in view of Baba U.S. Patent 5,875,162.

The Examiner rejected Claims 19, 20, 28, 31-34 under 35 USC 102(e) in view of Baba U.S. Patent 5,875,162.

In making the rejection under 35 USC 102(e), the Examiner has failed to construe, or has not correctly construed the limitation "adaptively" according to its meaning in the relevant field of control system art. Baba teaches controllers that provide only feedback control as discussed above. There is no disclosure in Baba of "...adaptively generating an output responsive to .. at least one of a torque and an inertia..." or "...adaptively generating an output which is based on adaptive parameter data as presently featured in claims 19 and 28.

Anticipation requires the disclosure in a single art reference of each element of the claim under consideration. W.L. Gore & Assoc. v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). However, as stated above, the "adaptively generating" limitation in claims 19 and 28 is not disclosed in the Baba reference. The rejection under 35 USC 102(e) is therefore improper. As a result, claims 19 and 28, along with dependent claims 20 and 31-34 are not anticipated and are allowable.

2.(Group I Claims) Claims 21-23, 29, 30 and 36 are non-obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of Clare et al. U.S. Patent 5,898,286.

The Examiner rejected claims 21-23, 29, 30 and 36 as obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of

Clare et al. U.S. Patent 5,898,286.

As discussed above in arguments concerning Issue 1, the limitation in each of the Appellant's rejected claims to "adaptively generating" is not taught in Baba. The limitation in each of the rejected claims to "adaptively generating" is also not taught in the secondary reference Clare et al. cited by the Examiner. There is no suggestion in either Baba or Clare et al. of "adaptively generating." The claimed feature of "adaptively generating" is completely absent from the art cited by the Examiner.

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher. W.L. Gore & Assoc. v. Garlock, Inc., 220 USPQ 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

The "adaptively generating" limitation in the Appellant's claim is not taught or suggested in either the Baba reference or the Clare et al. reference. The reading of the "adaptively generating" limitation into the references appears to be based improperly on hindsight. The rejection under 35 USC 103(a) is therefore improper. Therefore, claims 21-23, 29, 30 and 36 are not obvious and are allowable.

2.(Group II Claims) Claims 24, 26 and 27 are non-obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of Clare et al. U.S. Patent 5,898,286.

The Examiner rejected claims 24, 26 and 27 as obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of Clare et al. U.S. Patent 5,898,286.

In addition to the arguments above relative to the Group I Claims, the Group II Claims include an additional limitation to "a

controller circuit that is a discrete controller." This limitation is also not taught or suggested by either Baba U.S. Patent 5,875,162 or Clare et al. U. S. Patent 5,898,286. The rejection of Claims 24, 26 and 27 is additionally improper because Claims 24, 26 and 27 include a limitation to "a controller circuit that is a discrete controller" which is also not taught or suggested by either of the references cited by the Examiner.

3.(Group II Claim) Claim 25 is non-obvious under 35 USC 103(a) over Baba U.S. Patent 5,875,162 in view of Clare et al. U.S. Patent 5,898,286 and further in view of the Examiner's "official notice".

As discussed above in arguments concerning Issue 2, the feature of "adaptively controlling" is not taught or suggested by the Baba and Clare et al. references. The addition of the Examiner's "official notice" concerning pulse width modulation as a substitute for a digital to analog converter in Clare et al. does not add anything that relates to "adaptively controlling" as claimed in Claim 25 (Group II), and the assertion of "official notice" by the Examiner is moreover unsupported by any references.

Assertions of technical facts in areas of esoteric knowledge must always be supported by citation to some reference work recognized as standard in the pertinent art and the appellant given, in the Patent Office, the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference....Allegations concerning specific "knowledge" of the prior art, which might be peculiar to a particular art should also be supported and the applicant similarly given the opportunity to make a challenge. In re Pardo, 214 USPQ 673, 677 (C.C.P.A. 1982).

The assertion of "official notice" concerning pulse width modulation has not been supported by the Examiner and, in view of the above arguments concerning Issue 1 and Issue 2 is also

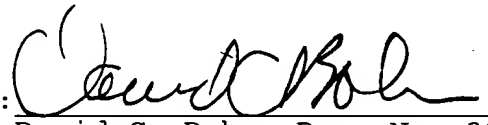
irrelevant to the issue of patentability of claim 25. The rejection based on "official notice" is therefore improper.

Conclusion

For the reasons advanced above, Appellant contends that each of the Claims on appeal is patentable. Therefore, reversal of all the rejections is requested.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

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Appendix A

19. An apparatus for adaptively generating an output responsive to a sensed position signal, a desired position signal and at least one of a torque and an inertia.

20. The apparatus of Claim 19, wherein the apparatus further comprises a controller circuit that has a controller gain that is adapted in a fixed range as a function of adaptive parameter data.

21. The apparatus of Claim 20 further comprising:
an adaptive system generating the adaptive parameter data according to an update equation.

22. The apparatus of Claim 21 wherein the adaptive system generates the adaptive parameter data based on both the torque and the inertia.

23. The apparatus of Claim 20 wherein the controller circuit is a discrete controller.

24. The apparatus of Claim 23 further comprising an actuator, and wherein the output comprises a controlled electric current coupled to the actuator.

25. The apparatus of Claim 24 wherein the controlled electric current is controlled by pulse width modulation.

26. The apparatus of Claim 24 wherein the controller circuit further comprises a digital-to-analog converter providing the controlled electric current.

27. The apparatus of Claim 24 wherein the sensed position signal is derived from a read/write head.

28. An apparatus comprising:

adaptive parameter data based on at least one of a torque and an inertia; and

a controller circuit for receiving a sensed position signal and adapted to receive reference data indicating a desired position, for adaptively generating an output which is based on the adaptive parameter data.

29. The apparatus of Claim 28 wherein the controller circuit comprises first and second controllers that are stable.

30. The apparatus of Claim 29 wherein the first and second controllers use an error model.

31. The apparatus of Claim 28 wherein the sensed position signal is sensed by a read/write head.

32. A method comprising the step of adaptively generating an output responsive to a sensed position signal, a desired position signal and at least one of a torque and an inertia.

33. The method of Claim 32 wherein the output is controlled based on adaptive parameter data.

34. The method of Claim 33 wherein the adaptive parameter data is updated based on at least one of a torque and an inertia.

36. The method of Claim 32 wherein the output is coupled to a voice coil motor in a disc drive.

Appendix B

Baba U.S. Patent 5,875,162

Clare et al. U.S. Patent 5,898,286

Appendix C

W.L. Gore & Assoc. v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

ATD Corp. v. Lydall, Inc., 48 USPQ 2d 1321, 1328 (Fed Cir. 1998).

In re Pardo, 214 USPQ 673, 677 (C.C.P.A. 1982).